C4

Each of the two charge areas or "columns" must contain only a fraction of the critical breakdown surface charge, seen in the horizontal direction, so that the horizontal surface charge is smaller than the critical breakdown surface charge Q_c. In the blocking case, the voltage is received by the power semiconductor component through mutual depletion of neighboring p-conductive and n-conductive areas. In other words, the charge carriers of one area electrically "compensate" for those of the oppositely charged area. In the individual planes, at low voltages, this leads to an electric field which is primarily directed horizontally.

In the Claims:

C5

Claim 1(amended). A vertically structured power semiconductor component, comprising:

a semiconductor body of a first conductivity type and having a first main surface and a second main surface opposite said first main surface;

a body zone of a second conductivity type opposite of said first conductivity type introduced into said first main surface;

a zone of said first conductivity type disposed in said body zone;

C5 cont.

a first electrode making contact with said zone and with said body zone;

a second electrode disposed on said second main surface;

an insulating layer disposed on said first main surface;

a gate electrode disposed above said body zone and separated from said body zone by said insulating layer; and

an intersection of said semiconductor body and said body zone defining a pn junction;

said semiconductor body having:

a layer thickness between said pn junction and said second main surface selected such that, when one of a maximum allowed blocking voltage and a voltage just less than this, is applied between said first electrode and said second electrode, a space charge zone created in said semiconductor body meets said second main surface before a field strength E created by an applied blocking

voltage reaches a critical value E_c at which an electrical breakdown is reached; and

C5 cont.

a specific charge density $\rho(z)$ of a layer in a direction z between said pn junction and said second main surface such that:

$$\int_0^W \rho(z)dz \leq 0.9Q_c$$

in which Q_c, the critical breakdown surface charge denotes a critical value of the breakdown surface charge Q at which the electrical breakdown is reached, said charge quantity Q being linked to said electric field strength E between said first electrode and said second electrode by the above equation

$\int_0^W \rho(z)dz \leq Q$ and Poisson's equation $\nabla E = -4\pi\rho$.